



Comprehension Strategy: As you read this story, think about the rocks you have seen. How are they like limestone? How are they different?

STAR!

Chris Sharma clings to a cliff like a spider. He scans the rock above him, looking for a spot to hold onto. There! He sees an impossibly small indent in the rock just out of reach.

“Aargh!” he yells as he leaps upward. His fingertips dig into the tiny hole while the rest of his body hangs in the air. He twists to brace his feet against a rough spot on the cliff. His grip secure, he lets out a big breath and looks for his next move.

To Sharma, climbing rocks is like playing connect-the-dots. He should know. He is a rock-climbing superstar. He travels the world looking for the most amazing and challenging rocks to scramble up.

For this climb, Sharma is in Yangshuo, China. The rock rises 46 meters (150 feet) above green fields. Dozens of other giant peaks just like it poke out of the ground for as far as he can see.

Like these rock spires, many of his favorite climbing spots have one thing in common. They are made of a kind of rock called limestone. Its maze of bumps, holes, ribs, and cracks “make it perfect for extreme climbing,” Sharma says.

Time Traveler

Limestone doesn't start out that way. It starts as tiny, scattered bits and pieces of animals. To understand, imagine if Sharma could zip back 400 million years while climbing that rock in China. He wouldn't be clinging to a cliff any more. He would be swimming!

Back then, water covered this area. Corals swayed in the salty sea. Prehistoric fish swam by. These creatures faced a very hard future—rock-hard, in fact. Many fish, corals, and other sea life were destined to turn into limestone.

Here's how it works. When a sea animal dies, its fleshy parts decay. Hard parts, like coral skeletons and shark's teeth, don't. They settle on the seafloor. Year after year, more hard parts drift down and pile up. Many are made of a mineral called calcite.

Over time, calcite adds up. Layers of mud and sand settle on top of it, too. The weight of all these bits and pieces presses down. It mashes and smashes all the parts. Gradually, the pressure hardens the calcite into limestone.

Mud and sand turn into rock, too. Mud hardens into shale. Sand becomes sandstone. These three rocks are **sedimentary rocks**, one of the three basic kinds of rock.



These limestone peaks near Yangshou, China, have become a hot spot for rock climbers.

Oceans Away

Limestone forms on the seafloor. Yet Sharma climbs high up on cliffs. How did limestone rise so high?

Over time, Earth's crust, or top layer, kept changing. In some places, the climate became colder or drier. The ocean dried up and so the water disappeared. The limestone seafloor became dry land.

Giant chunks of the crust smashed into each other, too. These chunks, called tectonic plates, float on mostly melted rock. They move slowly all the time. When two plates collide, the crust can buckle. The action can push the ocean floor sky high.

As a result, limestone shapes some of the world's most amazing mountain peaks. Take Mount Everest in Nepal. It's the world's highest mountain. To reach the top, climbers must scale ice, snow, and limestone.



Bumps, cracks, and grooves on this limestone cliff give Chris Sharma a way to cling to it.

HOW SEDIMENTARY ROCKS FORM



Beaches, ocean floors, and sand dunes can turn into sandstone.



Ocean floors and muddy beaches can turn into shale.



Coral reefs and shallow parts of oceans can turn into limestone.

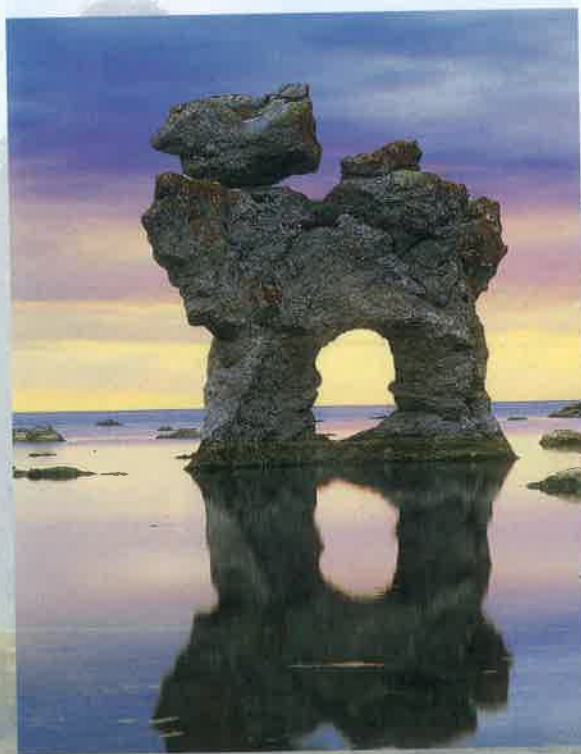
Windy Wonders

The rocks Sharma climbs aren't as high as Mount Everest. They're challenging, though. First, there's the steep climb. Then there's the rock's rough surface. It rubs his fingertips raw.

Believe it or not, the rock has taken a real beating, too. It may feel hard. Yet limestone is crumbly enough for wind and water to slowly sculpt it and eventually wear it away to nothing. This is called **weathering**.

To see weathering in action, go to the Sahara in Egypt. In a place called the White Desert, rocks shaped like giant mushrooms, chickens, and clouds rise from the sand. These fantastic formations got their start about 60 million years ago when a warm sea covered the land. Skeletons of microscopic animals formed a coral reef. The reef eventually became a smooth kind of limestone called chalk.

Once the chalk rose above sea level, the wind went to work. It swirled and picked up bits of sand. The sand scraped against the rock, just like sandpaper. Tiny pieces of chalk chipped off. The wind carried the chalk chips away. This action is called **erosion**. The strange shapes are all that's left today.



Carving Caves

Weathering happens under the ground, too. It starts with raindrops. As the water seeps through the soil, it becomes a weak acid. This acid can dissolve, or break down, calcite. That's the very stuff that limestone is made of.

The constant drip, drip, drip can hollow out rock. Underground, it carves caves. It can create giant caverns and tunnels that twist and turn like a maze. Sometimes the minerals in the dissolved limestone harden again. They turn into amazing shapes. Some shapes called stalactites look like fangs hanging down from the cave ceiling!

Sometimes those drippy shapes form outside caves. There, seeping water can mix with dissolved limestone to form vertical ribs called tufas.

As he climbs in Yangshou, Sharma spots a perfect tufa. He reaches out and grabs it, using it almost like a rope to haul himself higher. "I just pinch it and shimmy up," he says.

Looking for Limestone

Sharma stretches from tufa to tufa. His fingers dig into tiny pockets, or indents, in the cliff. Higher and higher he climbs. Finally, he reaches the top. He is the first climber to make it up one of the hardest rock climbs in China, so he gets to name the climbing route. He calls it "Spicy Noodle."

Sharma grins and enjoys the moment and the view. He imagines how, over time, water wore away at this land to create so many rocky spires. "For me, the great part about climbing is that it really connects you to the natural world," he says.

These sedimentary rocks make up much of Earth's crust. They tell stories of our planet's past. They build its beauty today. They will create rock-climbing challenges for many years to come.

Over time, pounding waves carved this sea arch.

WORDWISE

erosion: process in which rock is moved from one place to another

sedimentary rock: rock formed in layers and made out of natural objects such as skeletons, sand, mud, or other rock

weathering: process in which rocks are broken into smaller pieces



Wind and sand sculpted these towering chalk formations in Egypt's White Desert.

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